Ultra-high Precision
Auto-tracking Total Station

- 0.5”/1” Angular Accuracy
- High-Performance, versatile EDM
- 0.5 mm Distance Accuracy
- Optimised Auto-Pointing
- Laser Option for Tunnelling
- Windows CE Operating System
Topcon ‘Measuring Station’ Opens New Era in Ultra-Precision 3D Measurement.

Featuring a wide array of innovative technologies, the MS05A and MS1A total stations offer superior performance in angle and distance measurement as well as reliable robotic functionality. The ‘Measuring Station’ ensures dramatic enhancement in precision and productivity in all applications such as surveying, engineering, construction, monitoring and 3D industrial measurement.

**MS05A**

**Ultra-Precision Measuring Station**

- **0.5” Angle Accuracy**

  The MS05A employs innovative Independent Angle Calibration System (IACS) technology for unparalleled measurement reliability. Combined with market-proven absolute encoders that incorporate advanced coding and digital-processing technologies, the MS05A provides the industry’s highest 0.5” (0.15 mgon) angle measurement precision.

- **The Sub-millimetre EDM opens the door to unprecedented precision**

  Cutting-edge distance measurement technology ensures unparalleled comprehensive performance. Using reflective sheet targets, the MS05A provides sub-millimetre accuracy with a range of up to 200 m. With its 3.5 km prism-mode long-range capability and fast measurement speed, the MS05A also satisfies every requirement for the reference EDM that is employed for precise baseline calibration.

  - Sub-millimetre 0.5 mm + 1 ppm accuracy using reflective sheets within the range of 200 m.
  - Measures prisms with 0.8 mm + 1 ppm precision up to 3,500 m.
  - Reflectorless measurement can be performed with 1 mm + 1 ppm up to 100 m in range.
The new MS Series combines advanced technology and modern design innovations.

**MS 1A**

Long-range, versatile Measuring Station

- **1” - 1 mm Accuracy**

  The MS1A is primarily designed for precise construction applications providing 1” (0.3 mgon) angle accuracy and 1 mm ± 1 ppm distance measurement precision.

- **Wide Measurement Range**
  - A 200 m reflectorless measurement capability gives MS1A further versatility for applications where reflectors cannot be placed.
  - Measures up to 300 m with 50 x 50 mm reflective sheet targets.
  - Long-range capability reduces the need for changing instrument positions, resulting in higher work efficiency.

**Angle & Distance Measurement Performance**

<table>
<thead>
<tr>
<th>Model</th>
<th>MS05A</th>
<th>MS1A</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ANGLE MEASUREMENT</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Accuracy</td>
<td>0.5” / 0.15 mgon</td>
<td>1” / 0.3 mgon</td>
</tr>
<tr>
<td>Minimum display</td>
<td>0.1” / 0.02 mgon / 0.0005 mil</td>
<td></td>
</tr>
<tr>
<td>IACS</td>
<td>Provided (Independent Angle Calibration System)</td>
<td></td>
</tr>
<tr>
<td><strong>DISTANCE MEASUREMENT</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Accuracy</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reflective sheet</td>
<td>(0.5 + 1 ppm x D) mm</td>
<td>(1 + 1 ppm x D) mm</td>
</tr>
<tr>
<td>Prism</td>
<td>(0.8 + 1 ppm x D) mm</td>
<td>(1 + 1 ppm x D) mm</td>
</tr>
<tr>
<td>Reflectorless</td>
<td>(1.0 + 1 ppm x D) mm</td>
<td>(3 + 1 ppm x D) mm</td>
</tr>
<tr>
<td>Minimum display</td>
<td>0.01 mm</td>
<td>0.1 mm</td>
</tr>
<tr>
<td>Measuring range</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reflective sheet</td>
<td>1.3 to 200 m</td>
<td>1.3 to 300 m</td>
</tr>
<tr>
<td>One prism</td>
<td>1.3 to 3,500 m</td>
<td>1.3 to 3,500 m</td>
</tr>
<tr>
<td>Mini prism</td>
<td>1.3 to 800 m</td>
<td>1.3 to 1,000 m</td>
</tr>
<tr>
<td>Reflectorless</td>
<td>0.3 to 100 m</td>
<td>0.3 to 200 m</td>
</tr>
<tr>
<td>Measuring time</td>
<td>Fine: 2.4 s, Rapid: 2.0 s</td>
<td></td>
</tr>
</tbody>
</table>
Automated Measurement Capability Expands Applications.

- **MONITORING**
  Effectively performs displacement and deformation monitoring using state-of-the-art automated measurement capability.

  - Bridges, buildings, dams, mining sites, tunnels, railroads and other large structures, both existing and under construction, can be automatically monitored using remote control techniques.
  - MS05A and MS1A implement an advanced auto-pointing algorithm optimized for monitoring applications. The MS automatically sights the prism closest to the telescope center regardless of the distance from the instrument even if multiple prisms or other reflective objects are in the field of view. This feature dramatically enhances the reliability of periodic monitoring with predetermined prisms.

- **TUNNELS**
  Measure tunnel convergence and deformation more efficiently.

  - Quickly and accurately measures the convergence of tunnel supports, crowns and walls.
  - Rapidly measure tunnel cross-section profiles using the combination of reflectorless EDM and motor drive functionality. The long reflectorless range of MS1A makes it an ideal solution.
  - The auto-tracking function of MS05A/MS1A allows it to precisely control the position and attitude of a tunnel shield machine.
  - The optional LSP1 Laser Guide emits a visible laser beam for profile contour projection on tunnel faces.
  - MS05A/MS1A can be employed for automatic or unmanned monitoring of tunnels, either existing or under construction, to ensure safety and save labor.

- **CIVIL ENGINEERING**
  Major Civil engineering tasks demand the highest accuracy and reliability possible. The MS05A/MS1A dramatically increases construction efficiency and accuracy with its superior measurement capability in combination with unique target systems.
BRIDGES
Precise measurements using reflective sheet targets and compact prisms enable high-quality bridge construction with short lead times.
- In-process measurement of framework members ensures the accurate manufacture of each part, increasing productivity in on-site assembly.
- Automatically monitor displacement and deformation of existing bridges for maintenance and safety purposes.

PLANT AND PROCESS ENGINEERING
Position, geometry and dimensions of complex members of various plants can be measured with sub-millimeter accuracy.
- For as-built measurement where real precision is required.
- For precise positioning, leveling, vertical and in-line alignment of pipes, machineries, wind power generators and other components.

NUCLEAR
When absolute accuracy is required and no compromise is allowed, the MS05A provides a flexible solution for the precise measurement of dimensional stability and geometry of important structures.
- MS05A measures points with sub-millimeter accuracy using reflective sheet targets that can be directly applied to the measuring points.
- The easy-to-setup mobile system provides maximum convenience in 3D measurement from multiple positions.
Fully equipped with advanced features to enhance measurement efficiency.

- **Auto-Pointing**
  The auto-pointing function using reflective prisms or sheet targets realises automatic measurement for applications such as unmanned deformation monitoring systems.
  - 1,000 m Auto-Pointing range using one standard prism.
  - Advanced Auto-Pointing algorithms ensures reliable measurement to the predetermined prisms in periodic monitoring applications.

- **Auto-Tracking**
  The MS05A/MS1A constantly tracks a moving prism up to 90 km/h at a distance of 100 m, or 18 km/h at 20 m.
  - For continuous measurement of moving objects.
  - For precise position and attitude control of tunnel shield machines.
  - For high-precision setting-out tasks.

- **Perfectly Aligned Laser Pointer**
  The red laser pointer utilises the EDM measuring beam, and is therefore perfectly aligned with the EDM and telescope axes.

- **Multiple Data Storages**
  - Over 1 MB of internal data memory.
  - CF card Type II, SD card* and USB memory are supported.
  * CF type adapter required.

- **Unique and Versatile Targets**
  A full range of prisms and reflective targets are designed to maximize measurement accuracy and efficiency.

- **Superior Environmental Protection**
  - Highest in its class IP64 dust-water resistant withstands dusty or wet conditions.
  - Weatherproof multi-port maintains IP64 protection even with an RS-232C data cable or an external battery connected.

- **Fully Illuminated Keyboard**
  Both the display and full-alphanumeric keyboard on the control panel are illuminated allowing easy operation in tunnels, at night, and in low lighting conditions.

- **Target Illumination**
  - Prisms or sheet target can be located easily in dim lighting conditions using the high-intensity white LED built into the telescope.
  - Brightness and illumination pattern (blink or on) can be selected according to the environmental conditions.

- **LSP1 Laser Guide (option)**
  - The LSP1 – a laser beam emitter – can be built into the telescope of MS05A/MS1A.
  - In conjunction with motor-drive capability, the MS automatically emits the visible red laser in the programmed directions.
  - The bright laser beam can be utilized for automatic profile projection on tunnel faces in the NATM method as well as various construction setting-out tasks.
  - The narrow parallel beam reaches 700 m in underground conditions.
  - The beam diameter is as small as 30 mm at 200 m distance.
  - Beam pattern can be switched between Blinking and On to optimize visibility.

- **Windows CE**
  - MS05A/MS1A incorporate the flexible Windows CE operating system.
  - A large TFT color LCD display provides an easy to use intuitive graphic interface and touch screen operation.
Auto-pointing, Auto-tracking, Motor Drive, and Laser Option.

The Topcon MS series measuring stations are the latest, most advanced system on the market today combining a new modern design and advanced technology.

- Interchangeable Handles
- Gunsight
- Red Tech EX EDM Technology
- Super accurate distance measurement
- Swappable Li-Ion Batteries
- Windows CE 5.0 with Full Colour 3.5” Touch Screen
- USB, CF, SD & Serial Interfaces
- High precision angular measurements
- Bright White LED Lamp
- Vertical Jog Dial
- Measurement Trigger Key
- Horizontal Jog Dial

**Complete System**
- MS 0.5” or 1” Instrument
- Dual Charging Cradle
- Choice of optional field controllers
- Li-Ion Batteries
- Compact Carry Case
- Optional TopSURV on Board for MS
- Compatibility with DC3 remote controlled monitoring system
- Manuals & Utility software

**TopSURV Software**

The easy-to-navigate, intuitive user interface of TopSURV software offers all users its full functionality with the shortest learning curve. TopSURV supports all surveying tasks, including topo data collection, as built survey and stakeout.
Topcon offers positioning products that deliver unparalleled site-wide performance and integration. Topcon’s history of technological advances and our reputation for superior reliability means there’s no other company positioned to provide you with a better “Total Positioning Solution.” From survey to inspection Topcon, through our dealer network, provides the innovative technology that gives surveyors, civil engineers, contractors, equipment owners, and operators the competitive edge by addressing such critical issues as increasing profits, quality craftsmanship, improving productivity, lowering operating costs, and enhancing job site safety.

Full positioning integration field-to-finish: That’s the goal of Topcon. When it’s time for you to step up to the next level, it’s time to turn to Topcon.

The Leader in Customer Satisfaction...

To ensure that your Topcon instrument maintains peak performance, your local Topcon dealer offers factory trained and certified service technicians. If service isn’t available in your area, our European Service Center offers a repair and return policy second to none.

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The Leader in Positioning Technology ...

SPECIFICATIONS

<table>
<thead>
<tr>
<th>ANGLE MEASUREMENT</th>
<th>MS05A</th>
<th>MS1A</th>
</tr>
</thead>
<tbody>
<tr>
<td>Telescope</td>
<td>Magnification: 30x, Resolving power: 2.5&quot;, Minimum focus: 1.3 m</td>
<td></td>
</tr>
<tr>
<td>Angle measurement</td>
<td>Absolute encoder scanning. Both circles adopt diametrical detection.</td>
<td></td>
</tr>
<tr>
<td>Unit</td>
<td>Degree / Gon / Ml, selectable</td>
<td></td>
</tr>
<tr>
<td>Display resolutions (selectable)</td>
<td>0.1° / 0.5°, 0.02 / 0.01 mgon, 0.0005 / 0.002 mgon</td>
<td></td>
</tr>
<tr>
<td>Accuracy (ISO 17123-3:2001)</td>
<td>0.5°, 0.15 mgon, 0.0025 mgon, 1°, 0.3 mgon, 0.005 mgon</td>
<td></td>
</tr>
<tr>
<td>IACS</td>
<td>Provided (Independent Angle Calibration System)</td>
<td></td>
</tr>
<tr>
<td>Automatic dual-axis compensator</td>
<td>Dual-axis liquid tilt sensor, Working range: ±4° (±74 mgon)</td>
<td></td>
</tr>
<tr>
<td>Distance measurement</td>
<td>Modulated laser, Phase comparison method with red laser diode (680 nm)</td>
<td></td>
</tr>
<tr>
<td>Laser output”’ mode</td>
<td>Class 3R Reflectless / Class 1 Prism/Sheet mode</td>
<td></td>
</tr>
<tr>
<td>Measuring range”a</td>
<td>With reflective sheet (50 mm)”a 1.3 to 200 m 1.3 to 3,500 m / 1.3 to 800 m 0.3 to 100 m</td>
<td></td>
</tr>
<tr>
<td></td>
<td>One prism / mini prism 1.3 to 500 m 1.3 to 1,000 m 0.3 to 200 m</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Reflectless&quot;b 1.3 to 1,000 m 1.3 to 1,500 m / 1.3 to 800 m 0.3 to 200 m</td>
<td></td>
</tr>
<tr>
<td>Minimum display resolutions</td>
<td>0.00001 m (0.01 mm) 0.0001 m (0.1 mm)</td>
<td></td>
</tr>
<tr>
<td>Accuracy (ISO 17123-4:2001)</td>
<td>With reflective sheet”a (0.5 + 1 ppm x D) mm (0.8 + 1 ppm x D) mm</td>
<td></td>
</tr>
<tr>
<td></td>
<td>With prism (1 + 1 ppm x D) mm</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Reflectless&quot;b (1 + 1 ppm x D) mm</td>
<td></td>
</tr>
<tr>
<td>Measuring time”c</td>
<td>Fine: 0.9 s (initial 2.4 s), Rapid: 0.6 s (initial 2.0 s), Tracking: 0.4 s (initial 1.5 s)</td>
<td></td>
</tr>
<tr>
<td>Auto-pointing &amp; Auto-tracking</td>
<td>Pulse laser transmitter and CCD detector with co-axial optics</td>
<td></td>
</tr>
<tr>
<td>Auto-pointing range / -tracking range</td>
<td>one prism 1,000 m / 800 m 360° prism 600 m / 500 m</td>
<td></td>
</tr>
<tr>
<td></td>
<td>mini prism 700 m / 600 m</td>
<td>reflective sheet (50mm)”b 50 m / n/a</td>
</tr>
</tbody>
</table>

OS & CONTROL

Operating system Windows CE Ver.5.0
Display 3.5in. TFT QVGA backlit color LCD, Touch Screen on both faces

GENERAL

Dust and water protection IP64 (IEC 60529:2001) – maintained with external connections
Temperature –20 to +50°C (operating) / –30 to +70°C (storage)
Size with handle & battery W201 x D220 x H375 mm
Weight 7.7 kg (with handle & battery)
Power supply 7.2V DC
BDC58 detachable battery Li-ion rechargeable battery, 7.2V, 4.3Ah, 2 BDC58 are included as standard
Operating time at 20°C”d 3 hours External battery BDC61 (Ni-MH, 13Ah): Approx. 9 hours

Your local authorised Topcon distributor is:

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